

SYNTHETIC OILS

I. POSTION

1. Synthetic oils have been made from coal, oil shale and tar sands, but so far the production cost has not been competitive with that of natural crude.

2. Coal and oil shale are solids and tar sand bitumen is very viscous; each of these hydrocarbons would be mined, separated from the non-hydrocarbon components and processed to useful flowable oils such as fuel oil or synthetic crude oil.

3. The oils produced would have low sulfur content and no heavy end products; accordingly, the fuel oils would be attractive for meeting ambient air standards and the synthetic crudes would be premium refinery feedstocks.

4. The primary U.S. resource areas that have production potential for the United States for the rest of this century are the oil shales in Colorado and Utah and coal reserves in the Illinois Basin and the Western United States.

5. Large deposits of tar sand exist in the Athabasca area of Alberta, Canada, apparently well in excess of Canadian needs. One project is currently producing about 50,000 barrels per day of synthetic crude oil, and a larger project is scheduled for production in 1976-77.

6. Large deposits of oil shale exist in the Rocky Mountains, principally on Federal lands. Extensive research and development by industry and government have been conducted in past years to develop commercial processes to extract oil by retorting crushed shale. One private venture is now operating a semi-works demonstration operation producing 750 barrels a day.

7. Large coal resources exist in the United States. Research and development work for making oil underway by government and industry is of significant but not major magnitude. Technologically, the liquid-from-coal development is not as mature as similar work for tar and shale. However, the possibility of hybrid systems, producing oil, gas and char (as a coal substitute) might lead to economic breakthroughs.

II. PROBLEMS

1. Operations must be large in scale (50,000-200,000 b/d) and mineral properties high in quality to develop lowest unit costs. The scale requirements lead to large capital commitments (\$200-\$600 million per plant).

2. Large-scale pilot plants or semi-works operations and demonstration plant operations costing tens of millions of dollars are required to advance technology and to lower performance risks for pioneer commercial plants.

3. Pioneer commercial plants will probably be economically marginal. They will be early on the learning curve, and their high initial capital cost make them economically vulnerable to contingencies common to prototype plants.

4. The contingent impact of changing import policies has been a major deterrent to: (1) risking large mounts of development expenditures on pilot or demonstration plants; and (2) venture capital on pioneer commercial plants.

5. After the advent of commercial technology, the production levels of synthetic oil may be limited by regional water supplies rather than by the reserve base.

6. Production of synthetic oils will raise some environmental issues because current production technology involves mining. However, the operations will be new "grass roots" facilities, and contemporary environmental standards can be incorporated into the design at the outset at appropriate cost.

III. OUTLOOK

1. The most economical approach to developing synthetic oils production is a gradual one that permits each operation in the development and early commercial stages to benefit from experience of the previous operation.